REMARKS/ARGUMENTS

Claims 1-25 are pending. Claims 1, 11, and 21 have been amended. New claims 24 and 25 have been added. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Claims 1-4, 6, 9, and 10 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Bhakta et al. (US 2002/0081817). Claims 11-14, 16, 19, and 20 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Bhakta et al.

Applicants respectfully submit that independent claims 1 and 11 are novel and patentable over Bhakta et al. because, for instance, Bhakta et al. does not teach or suggest performing a the plasma-enhanced chemical vapor deposition (PECVD) process with tetraethylorthosilicate (TEOS) as a gas source to deposit an oxide layer on the bottom and sidewall of the trench structure and the semiconductor substrate, the oxide layer only partially filling the trench; and removing the oxide layer on the sidewall of the trench structure substantially completely and the oxide layer on the bottom of the trench structure partially to define a remaining oxide layer as the bottom oxide layer.

In Bhakta et al., the oxide layer 22 is a trench fill layer for substantially filling the trench 18. "In FIG. 3h, a first layer 22 of an insulating trench fill material is deposited in the trench 18 and over the silicon nitride layer 14 at a slow rate of deposition. The slow rate of deposition allows the side walls to grow in a uniform manner that avoids producing a void in the deposited material. The resulting trench fill has a depression 23 centered over the trench, as shown in FIG. 3h. The trench fill material of the first layer 22 is deposited at least until the side walls of the trench meet in the center of the trench." Paragraph [0019]. Furthermore, Bhakta et al. does **not** remove the oxide layer 22 substantially completely from the sidewall of the trench to define a remaining oxide layer as the bottom oxide layer. As seen in Figs. 3j-3l, the oxide layer 22 remains on the sidewall of the trench 18 and, indeed, remains substantially filling the trench 18.

For at least the foregoing reasons, claims 1-4, 6, 9-14, 16, 19, and 20 are novel and patentable over Bhakta et al.

Claims 5, 7, and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bhakta et al. in view of Ahn (6,596,607). Claims 15, 17, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bhakta et al. in view of Ahn. The Examiner acknowledged that Bhakta does not teach the temperature range recited in claims 5 and 15, the wet-etching process recited in claims 7 and 17, or the etching selectivity recited in claims 8 and 18. The Examiner notes that there is no evidence indicating the temperature range in claims 5 and 15 is critical, and cites Ahn for allegedly disclosing the other two features.

Even assuming the Examiner's assertions are valid, Ahn still does not cure the deficiencies of Bhakta et al., since Ahn also fails to teach or suggest performing a the plasma-enhanced chemical vapor deposition (PECVD) process with tetraethylorthosilicate (TEOS) as a gas source to deposit an oxide layer on the bottom and sidewall of the trench structure and the semiconductor substrate, the oxide layer only partially filling the trench; and removing the oxide layer on the sidewall of the trench structure substantially completely and the oxide layer on the bottom of the trench structure partially to define a remaining oxide layer as the bottom oxide layer.

Therefore, claims 5, 7, 8, 15, 17, and 18 are patentable over Bhakta et al. and Ahn.

Claims 21-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bhakta et al. in view of Ahn.

Applicants respectfully assert that independent claim 21 is patentable over Bhakta et al. and Ahn because, for instance, they do not disclose or suggest depositing an oxide layer on the bottom and sidewall of the trench by plasma-enhanced chemical vapor deposition (PECVD) process with tetraethylorthosilicate (TEOS) as a gas source at a temperature of about 440℃ to about 520℃, the oxide layer only partially filling the trench; and removing the oxide layer on the

sidewall of the trench substantially completely and the oxide layer on the bottom of the trench partially to form a remaining oxide layer as the bottom oxide layer on the bottom of the trench.

As discussed above, Bhakta et al. discloses an oxide layer 22 that substantially fills the trench 18, and is completely devoid of any teaching or suggestion for removing the oxide layer 22 from the sidewall of the trench. For at least these reasons, claim 21 and claims 22 and 23 depending therefrom are patentable.

New claims 24 and 25 depend from claim 1, and recite additional features that are not taught or suggested in the cited references, including an oxide layer having a ratio of thickness on the bottom of the trench to thickness on the sidewall of the trench of higher than about 1.5 and lower than about 2.3.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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